mental operations, as seen in the rise and progress of the exact sciences. A liberal proteid input is serviceable in such morbid conditions as tuberculosis, hysteria, neurasthenia, &c. The evil influence of parsimony in nutrition has been shown by the researches into the condition of elementary-school children in large towns.

Mr. C. Gordon Hewitt read a paper on the biology of house-flies in relation to public health before a joint meeting of the preventive medicine and bacteriology sections. After a short description of the more important characters and the breeding habits of the species of flies that inhabit houses, the chief of which is *Musca domestica*, the public health aspect of the question was discussed. It had been proved that house-flies are able, if the necessary conditions were present, to carry the pathogenic bacilli of such infectious diseases as tubercle, cholera, anthrax, and those of an enteric nature. He contended that house-flies were not only able to be largely responsible for the dissemination of these diseases, but that summer diarrhœa, which was the greatest cause of infantile mortality, was largely due to the combined action of house-flies and unsanitary conditions. It was a striking fact that in places where the water-system of sewage disposal was used, the death-rate from infectious disease of an enteric nature was less than that of places where the older conservancy methods were employed. The study of the breeding habits indicated the means of reducing the evil for which they were responsible. In the discussion which followed, a number of members referred to the connection between flies and infantile diarrhœa.

Dr. C. W. Saleeby contributed a paper on racial hygiene or negative eugenics. He advocated the forbidding of parentage to the drunkard, the chronic inebriate, or the dipsomaniac. Our studies might now be extended, he thought, from the hygiene of the individual to that of the race.

The spread of tuberculosis by means of milk and meat was made the subject of several interesting papers which provoked considerable discussion.

Dr. A. M. Fraser showed that of the 60,000 people who die annually from tuberculosis, 11,000 are children under five years of age, that is to say, among the section of the community most dependent upon milk for its nourishment, 11,000 deaths occur from the disease. It has been demonstrated that 10 per cent. of the milk sent in churns to the cities of Liverpool, Manchester, Leeds, Birmingham, and Sheffield is infected with tubercle bacilli. Meat affected with tubercle is systematically sold in the markets for human consumption. He suggested the systematic inspection of farms by qualified veterinary inspectors and the elimination of tubercular animals; also, the improvement of the conditions under which the cows lived.

Prof. Cameron stated, in the discussion, that he believed town milk was freer from tubercle bacilli than country milk, and that the latter was contaminated before it left the country.

Mr. Thomas Ryan read a paper before the engineering and architectural section on radio-activity in water from hot springs. As Strutt has found that the residue deposited in the Buxton and Bath hot spring waters, he was of the opinion that the Buxton water contained radium emanations, which view, he said, was supported by the fact that a large amount of nitrogen was present in the water. He urged further research on the subject.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—Prof. W. J. Pope, F.R.S., professor of chemistry and head of the chemistry department in the Municipal School of Technology, Manchester, has been elected to succeed Prof. G. D. Liveing, F.R.S., in the chair of chemistry.

LONDON.—At the meeting of the Senate on July 22, Dr. H. A. Miers, F.R.S., was appointed principal of the University in succession to Sir Arthur Rücker, F.R.S., who retires on September 30. Dr. Miers is at present Waynflete professor of mineralogy at Oxford, and fellow of Magdalen College. He has had a good deal of administrative experience at Oxford, being a member of the Hebdomadal Council, a delegate of the University Press, a delegate for the inspection and examination of schools, and secretary to the delegates of the museum. He served on the council of the Royal Society, 1901–3, and is at present president of the Mineralogical Society and of the Public Schools Science Masters' Association. He was educated at Eton and Trinity College, Oxford, and after graduating served as assistant in the British Museum (1882–95), and as instructor in crystallography at the Central Technical College (1886–95). He was appointed professor of mineralogy at Oxford in 1895, and is now fifty years of age.

Important modifications have been made in the regulations in medicine for internal and external students. After January, 1909, there will be three examinations for medical degrees (M.B., B.S.)—the first, second, and third. The first examination (replacing the preliminary scientific examination, part i.) will still consist of chemistry, physics, and general biology, but new syllabuses, of a more professional character, have been approved. The second examination will be in two parts, part i., organic and applied chemistry, and part ii., anatomy, physiology, and pharmacology, including pharmacy and materia medica. The third examination for medical degrees is similar to the present final examination, which it replaces. The whole course, both for internal and for external students, will extend over at least five and a half years, of which at least three must be devoted to the final subjects. After July, 1909, the scholarships at present offered for anatomy, physiology, and pharmacology will be withdrawn.

The Imperial College of Science and Technology has been admitted as a school of the University in the faculties of science and engineering.

The Royal Army Medical College, Millbank, has been admitted as a school of the University in the faculty of medicine for officers of the Royal Army Medical Corps.

The following degrees have been granted:—D.Sc. in physiology to Miss Winifred Cullis, an internal student of the London School of Medicine for Women; D.Sc. in physics to Mr. S. W. J. Smith, an internal student of the Royal College of Science; D.Sc. in zoology to Mr. W. N. F. Woodland, an internal student of University and King's Colleges; D.Sc. in zoology to Mr. R. E. Lloyd, an external student of University College, Marine Survey, India, and Indian Museum; D.Sc. in geology to Mr. T. F. Sibly, an external student of Birmingham University; B.Sc. by research in chemistry to Mr. Jacob Fox, East London College.

DR. NANSEN has been elected professor of oceanography at the University of Christiania.

THE Society of Merchant Venturers has decided to petition His Majesty in Council in favour of the grant of a charter for the establishment of a University of Bristol on the lines of the draft charter prepared by the local university college, but suggesting certain modifications, which will define more precisely the position in the University to be occupied by the university classes of the Merchant Venturers' Technical College. Among the most important are those which provide that Bristol students whose means are small shall still be able to obtain a university education at fees as low as those charged by the Merchant Venturers' Technical College, and that the degrees of the University shall be open to evening students.

THE Royal Commissioners of the Exhibition of 1851 have appropriated the whole of the remaining site of their estate at South Kensington for the purposes of the Imperial College of Science and Technology. This announcement was made at a meeting of the governing body of the college on July 24. The question of the provision of additional buildings and laboratories on the sites granted by the Commissioners was under consideration, and it was decided, in the first instance, to proceed at once with the provision of new mining and metallurgical buildings for the Royal School of Mines, and to invite Sir Aston Webb, R.A., to serve as architect to these buildings and of such other buildings as the governing body may determine to erect. The Hon. R. J. Strutt, F.R.S., was appointed by

the governors additional professor of physics, and Mr. S. Herbert Cox as full-time professor of mining. An additional professor of zoology, a professor of metallurgy, and an assistant professor of botany are to be appointed shortly.

THE Manchester Microscopical Society is doing some excellent pioneer work through the agency of its extension section, the objects of which are to spread the knowledge of microscopy and natural history among outside associations by means of lectures and demonstrations. We have received a copy of the society's lecture list for 1908–9, and find that local associations in or near Manchester may select from forty-seven lectures on botanical, zoological, and nature-study subjects, which certain members of the society are willing to deliver gratuitously. The associations securing the services of lecturers are expected to pay for hire of lantern-slides, travelling and out-of-pocket expenses only. The Manchester Microscopical Society is to be congratulated upon its efforts to bring scientific knowledge, in a popular form, before associations of persons anxious to be instructed. Full particulars of this enterprising scheme may be obtained from Mr. R. Howarth, honorary secretary of the section, 90 George Street, Cheetham Hill, Manchester.

WE have received from Prof. L. Weber, of the University of Kiel, a copy of his report to the Magistrate of Kiel on the daylight illumination of the various primary and secondary schools of the town, thirty-four in number. At each of these schools measurements have been made of the illumination of a surface placed horizontally on desks selected as the best, medium, and worst illuminated, in about four of the most representative of the rooms of the school, on days when the illuminating power of the sky was known. In addition, the solid angle subtended by the portion of sky visible from each of the three desks, and that subtended by the sky visible from the middle window of each of the rooms tested, were observed. The report contains a description of the apparatus used, and details of some of the most interesting cases are given. Prof. Weber considers that an illumination equal to thirty candles at a metre distance throughout the darkest month should be taken as a minimum, and on this basis about 5 per cent. of the rooms tested are deficient, and should be improved by the provision of larger windows or by the trees in front of the windows being trimmed. In congratulating Kiel on the wisdom it has displayed in having an investigation of this kind carried out, one is tempted to ask whether any town of the size of Kiel in this country has ever thought it worth its while to have such measurements made, or is everyone too much absorbed in the educational controversy to think of the eyesight of the child?

EARL PERCY took part in the debate on the Indian Budget in the House of Commons on July 22, and in his speech gave a prominent place to the problems of Indian education. After instituting a comparison between the conditions of elementary education in this country and in India, he said that in England our system of education is directed towards preparation for an industrial career. In India almost the only industry is agriculture, but the system does nothing to qualify the people for their calling in life, and any special aptitude finds no outlet except in the law or in Government employment. Speaking of technical education, he remarked that it is seven years since a conference at Simla went into all the phases of Indian education, primary, secondary, and technical, and passed an enormous number of resolutions, upon which it was expected prompt action would have been taken. The resolutions dealt with the neglect of the study of the vernacular, recommending that it should be carried on throughout; that the results of examination should be taken as passports to the universities and Government employment; that in secondary schools a modern side should prepare pupils for a commercial career; that relations should be established between school authorities and chambers of commerce; and, lastly, the subject of technical education was dealt with in a valuable report. Industrial institutions were recommended for the different provinces connected with special local industries, with a system of apprenticeship in workshops under the supervision of Europeans, and the training of village schoolmasters in tillage. Are we really making substantial progress in any of these directions? he asked, and answered the question by saying the whole reforming energy of the Government seems to have been directed to the universities. The increase in educational expenditure has taken place on too low a basis; the total amount is almost insignificant. How can we ask the Indian to believe that his own Government, which in the last three or four years has sacrificed three or four millions of revenue from the salt duty and opium, and is contemplating large borrowing powers, cannot find money enough to spend on the development of technical education, which is of vital interest if the people of India are to be prepared to take their proper part in the development of industries? With regard to the general administration of education, Earl Percy thinks we shall never get any real enthusiasm or progress until the administration is reformed. There is now a director-general of education, but it is still the fact that, not only is there no member for education in the Viceroy's Council, but the director-general, if he wishes to bring any educational matter before the member who represents the home department, has to do so through the ordinary machinery of the office. Earl Percy expressed the opinion that, having a member on the Council directly representative of and responsible for education, the director-general ought to be given the same right and privilege of free access to the Viceroy which it is proposed to give to the new President of the Railway Board.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, May 7.—"Seleno-aluminium Bridges." By Prof. George M. **Minchin**, F.R.S.

A seleno-aluminium bridge consists of two plates, P, Q, of aluminium separated by a very thin flake of mica and having a thin layer of sensitive (or conducting) selenium spread across one edge of the mica and the two adjacent portions of the aluminium plates. We have thus the separator of mica bridged over by the selenium, which, of course, adheres to the two aluminium plates. If before the bridge of selenium connected these plates, P, Q, the plates were connected in series with a battery and a galvanometer, no current would flow, but when the selenium bridges over the mica separator, the current passes. Let C_0 denote the strength of this current when the bridge is completely screened from light. C_0 will, of course, depend on the voltage of the battery and the thickness of the mica separator, as well as on the length of the edge of mica covered by the selenium.

If now the selenium layer is exposed to light, the current will be increased—multiplied five times, or more, if daylight is allowed to fall on the selenium.

Owing to the extreme thinness of the mica, the intensity of the light along any line of a spectrum (say that of a star) can be measured if we know the way in which the current-strength, C, depends on the intensity, i, of the light. The main object of experiments carried out recently in the electrical laboratory at Oxford was to discover the relation between C and i. After many assumptions of the form $C = C_0 + k\sqrt{i}$, and others, it was found that no such assumptions satisfy the observations, but that an equation of the form $\log \frac{C}{C_0} = ki^n$, where k and n are constants for the particular kind of light employed, agrees very well with experiment. Thus, suppose that we are using red light of a particular wave-length, let C_1 be the value of current when the intensity of this light is i_1, and let C be the current when the intensity is i; then our equation is

$$\log \frac{C}{C_0} = \left(\frac{i}{i_1}\right)^n \log \frac{C}{C_0} \quad . \quad . \quad . \quad . \quad . \quad (1)$$

The red light employed was that obtained by passing the light of a Nernst lamp through a thick column of water (to cut off heat), and then through a solution of fuchsine. This light was passed along a dark cylinder 6 metres long, the length of which could be varied by removing metre lengths successively, and, as the selenium bridge was at one end of this cylinder, i was varied. Blue light